

MODEL

292

WHEELCO INSTRUCTION MANUAL

MP MASTER



MA32101



BARBER-COLMAN COMPANY

Wheelco Instruments Division

ROCKFORD, ILLINOIS, U. S. A.

UNPACKING THE INSTRUMENT

This Wheelco Instrument and its associated equipment have been carefully packed at the factory. Remove the instrument and its accessories carefully from the packing box and check the part numbers against the packing slip.

CAUTION: Handle with care. Avoid oil accumulation.
 Safeguard instrument from shock. Keep instrument temperature under 130° F.

DESCRIPTION

The meter indicates the temperature at the hot junction of a connected thermocouple. Two small flat coils, mounted on the control setting index, are connected to the electronic control circuit. A small metal flag on the indicating pointer will cause a control action as it enters between the two coils.

SPECIFICATIONS

Refer to Specifications on Scale Plate.

(A) Thermocouple:

The type of thermocouple to be used with meter is shown on the scale plate as follows:

C/A - Chromel vs. Alumel
 I/C - Iron vs. Constantan
 Pt. 13% - 13% Rhodium, 87% Platinum vs. Platinum
 Pt. 10% - 10% Rhodium, 90% Platinum vs. Platinum

(B) The external resistance for which the meter has been calibrated is shown at the bottom of the scale pan and is the combined resistance of the thermocouple plus the resistance of the extension lead wire.

External Resistance Marking On Scale

1. All instruments marked "15 ohms" or "15 + 10 ohms" require an External Resistance Compensator Plug which is to be screwed into one of the T/C terminals on terminal Panel. The resistance of this plug is to be equal to 15 minus actual value of T/C and T/C lead resistance.
2. All instruments marked other than "15 ohms" or "15 + 10 ohms" were calibrated for actual value of T/C and T/C lead resistance specified at time of manufacture and unless installation was changed since that time do not require either the External Resistance Compensator Plug or form of compensation for external circuit resistance.

(C) This instrument will operate on 105-125 volts or 210-250 volts AC depending on which (115 or 230) voltage selector plug is used. Frequency of power supply must be same as shown on rating plate.**(D) The control action is of the H-C-L type, that is, the control circuit relay has SPDT contact action. Rated capacity of the contacts are 10 amperes at 115 volts or 5 amperes at 230 AC for non-inductive loading. For inductive loading, decrease ratings by 50%.**BEFORE INSTALLING

- (A) Remove the meter from the case by removing the four corner screws holding the front cover with the meter. Handle with care.
- (B) Be sure the line voltage and frequency to be used are the same as shown on the voltage selector plug used and the rating plate.
- (C) Make sure that the voltage supplied to auxiliary equipment is correct.

LOCATION

- (A) The instrument should be located to avoid vibration, shock, dirt, moisture, oil dripping and temperatures over 130° F. Example: Avoid furnace walls, machine frames, contactor panels, and outside walls.
- (B) Glaring reflections on the scale window should be avoided.

MOUNTING

- (A) Moderate care should be taken to mount the instrument level.

(over)

- (B) Screw holes for flush mounting are accessible after removing meter from the case. See mounting dimension sheet.
- (C) For surface mounting, remove the meter from the case. Remove the tube from the electronic control chassis. Remove the two screws at the extreme lower corners of the electronic chassis. Loosen the two screws in the slip holes located at the upper rear of the electronic chassis. Lift chassis up and out of housing. See mounting dimension sheet.

WIRING

- (A) Be sure the line voltage on voltage selector plug and frequency on rating plate to be used is correct. Voltage selector plug is located on the terminal panel of the instrument reached by removing meter housing. If desired the voltage can be converted by changing voltage selector plugs (only change necessary) from 230 volts to 115 volts.
- (B) Refer to suggested external wiring diagrams for typical circuits.
- (C) Run all wires in pipe, conduit or Greenfield (BX) over entire length in accordance with local electrical code. Run thermocouple extension lead wire in separate conduit. Wires for TCB (if used) can be run in same conduit with lead wire.
- (D) Ground the instrument case. A grounded conduit system is usually sufficient.
- (E) Use properly fused switches, as indicated on the diagrams, to protect the instrument.
- (F) The plug-in terminal strip for thermocouple lead wire connections is located on the right side of the meter.
- (G) Use only extension lead wire supplied with the instrument or extension lead wire correct for use with the type of thermocouple specified on the scale. Ordinary copper wire will NOT serve the purpose. Reversed extension lead wires result in wrong readings.
- (H) Proper polarity (+) and (-) of the extension lead wire must be observed to obtain true readings. Upscale direction of the pointer movement is not sufficient evidence of correct polarity. Normally, the color coding is indicated on a tag attached to the extension lead wire when shipped. The following procedure definitely checks the correctness of extension lead wire polarity: Attach the lead wire (without the thermocouple) and twist the free ends together; heat the junction thus formed. Deflection upscale means polarity is correct for the lead wire connections to the meter. If the indicating pointer moves downscale, reverse the wires at the meter.
- (I) The thermocouple should then be connected to the extension lead wire and the pointer should move upscale when the thermocouple hot junction is heated. If the indicating pointer moves downscale, reverse only the connections at the thermocouple head, since the extension lead wire has already been correctly connected to the meter terminals.
- (J) Thermocouple Location: The temperature that will be controlled is that of the thermocouple "Hot Junction". The location of the hot junction should be away from the load far enough to be partially affected by the source of heat to reduce overshooting. Most applications require a thermocouple protecting tube because bare thermocouples, used in atmospheres or media causing chemical reaction may deteriorate the couple and destroy the calibration.
- (K) If the instrument is equipped with Thermocouple Break Protection feature (TCB) use copper wire (14 ga. satisfactory) to connect the TCB terminals to the connector block in the thermocouple head. (+) terminal should be connected to (+) terminal in the thermocouple head and (-) to (-).



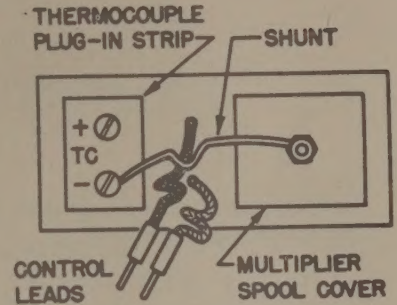
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ROCKFORD, ILLINOIS, U. S. A.

ADJUSTMENTS AND CHECKS BEFORE USING

- (A) After the instrument case is mounted, disconnect the shunt wire or link located on the right side of the meter at the TC (thermocouple) terminals. This connection electrically dampens the meter movement for protection during installation or handling. Then place meter housing in the case.

Note: Replace the shunt wire or link when handling or reshipping the instrument.



- (B) **IMPORTANT.** When placing the meter housing in the case, insert the control leads in the jacks located just forward of the tube. Place red lead in jack coded red.
- (C) Check meter indication on open circuit. The pointer should come to rest at the ambient (meter) temperature. It is NOT supposed to read zero. The thermocouple circuit can be opened at the thermocouple connector block.
- (D) If the pointer does not come to rest at the ambient temperature, it should be adjusted by slowly turning the zero adjuster screw (ZERO ADJ.) until the pointer rests at the instrument temperature, as checked by a thermometer with its bulb directly on the meter thermocouple terminals. Reconnect the circuit after the checking is completed.
- (E) This instrument is equipped with automatic cold junction compensator. By using extension lead wire from the thermocouple cold end to the meter terminals, the effective cold end is brought to the instrument. The compensator then causes the pointer to follow changes in room temperature eliminating the necessity of changing the ambient (meter) setting.
- (F) To check operation of thermocouple break protection (TCB) if instrument is so equipped disconnect thermocouple from connector block, simulating a broken thermocouple. Pointer should then go upscale past control setting. If pointer goes downscale, TCB leads are open or reversed. This check is to be made with power on the instrument.
- (G) Check the auxiliary equipment independently of the controller, after wiring is complete, to guard against faulty wiring and possible damage to the controller contacts.
- (H) Close manual fuel valves, or open the furnace heating switch if separate from the control circuit.
- (I) Power the instrument and allow 15 seconds for warm-up. When red control pointer is above the black temperature indicating pointer, control C to L is made and pilot light is on. Using the control setting knob (located just below the indicating scale), move the red pointer slowly downscale past the black pointer. As the pointers coincide, the control will operate to make H to C contacts and pilot light will go out.
- (J) If control operation does not occur when red and black pointers coincide, instrument must be tuned. The tuning adjustment screw is accessible by removing cover plug to the right of the bulls eye. If the control action operates from ON to OFF before the temperature pointer reaches the red control set point, turn the tuning adjustment slightly to the left. Turn to the right if the temperature pointer passes beyond the red control point. Use a small insulated handle screw driver for this purpose.

OPERATION

- (A) The control set point is adjustable by use of the external knob, located just below the indicating scale.
- (B) The indicating pointer will move to indicate the temperature of the hot junction of its connected thermocouple. All power for the meter is generated by the thermocouple, no dry cells or batteries are necessary.
- (C) Normal control operation occurs after approximately 15 second warm-up period. Instrument will keep the heat ON, pilot light will also turn on until the indicating pointer reaches the red control set point. The control will then operate to turn the heat OFF, pilot light will also turn off. Thus the instrument will operate to control the temperature ON and OFF at the desired control point.

(over)

MAINTENANCE

- (A) Do NOT oil or grease any part of the instrument at any time. Pivot and jewel construction is used for the meter movement.
- (B) Check cold end or ambient meter setting regularly, as explained under "Adjustment and Checks Before Using".
- (C) Inspect all terminal connections regularly, both thermocouple and control circuits.
- (D) Be sure lead wire and thermocouple polarity is correct and wires are not damp or grounded or an error in reading will result. Only the hot junction of the thermocouple may be grounded.
- (E) Inspect thermocouple regularly. Examine for signs of deterioration such as scaling or breaks. Replace thermocouple when these indications become more than a trace as accuracy may be effected. The protecting tube should also be examined for leaks.
- (F) Be sure the tube and plug-in strips are well inserted in their sockets.
- (G) If the instrument does not operate and tuning adjustment does not restore control action, the electronic tube should be replaced. Use only a carefully tested 6SN7-GT electronic tube. This tube is accessible by removing the meter unit.
- (H) Replace the electronic tube yearly since the cost is little compared to possible service interruption.
- (I) An inspection of the electronic tube may be made using a test meter (0-20 MA. DC.), and a plate current checking plug - A2632. Remove plug immediately below voltage selector plug and insert A2632 checking plug. Connect the leads to the test meter. The normal tube output is 8 to 11 MA. when control is in the ON position and 2 MA. or lower when control is in the OFF position. Replace tube if these readings are not obtained.
- (J) Remove the two knock-out plugs located above and below the electronic tube for ventilating the electronic chassis if ambient temperatures are high.



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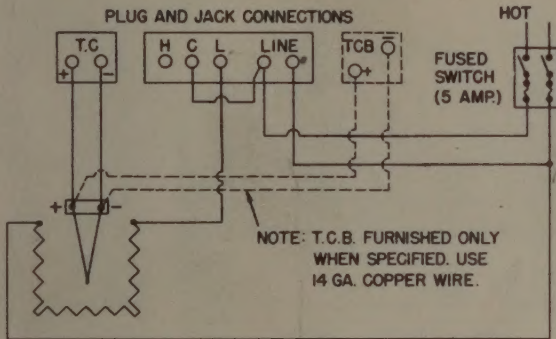
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EXTERNAL WIRING DIAGRAMS

WHEELCO MODEL 292 INDICATING PYROMETER CONTROLLER

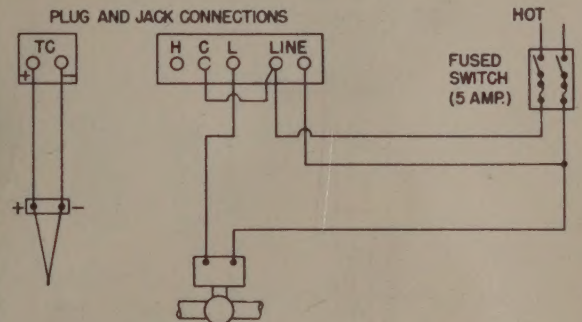
**SMALL ELECTRIC FURNACE
(UNDER 5 AMP.)**

①



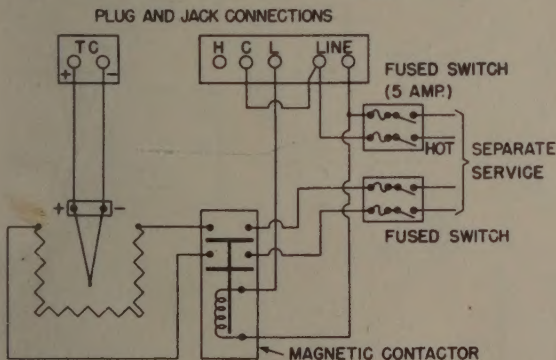
**SOLENOID VALVE OR
SPRING RETURN MOTOR-VALVE**

②



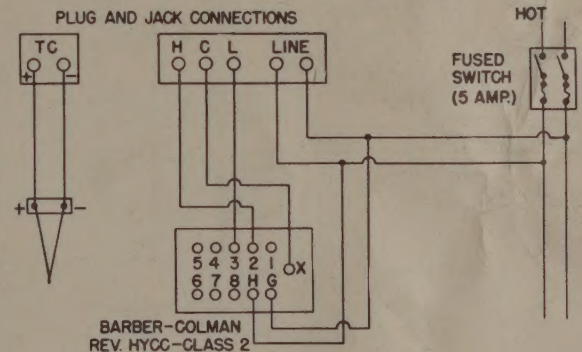
**LARGE ELECTRIC FURNACE
WITH CONTACTOR
(SOLENOID CURRENT BELOW 5 AMP.)**

③



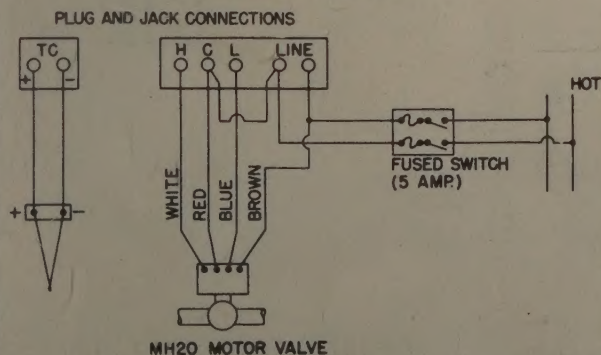
**BARBER-COLMAN
CONTROL MOTOR**

④



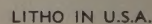
**4-WIRE CONTROL
MOTOR-VALVE**

⑤



NOTE:

1. INSTRUMENT CONTACT RATINGS: 5 AMPERES FOR 115 VOLTS A.C. 2.5 AMPERES FOR 230 VOLTS A.C. NON-INDUCTIVE LOADING. FOR INDUCTIVE LOADS DECREASE RATING 50%.
2. USE PROPER VOLTAGE PLUG TO CORRESPOND WITH SUPPLY.
3. REMOVE SHUNT AT METER HOUSING BEFORE USING.



4-HOLES IN FLANGE FOR MOUNTING COVER

7 $\frac{5}{8}$ "

3 $\frac{15}{8}$ "

4-HOLES FOR 6 PL. HD. SCREWS

7 $\frac{9}{16}$ "

OUTSIDE OF HOUSING

3 $\frac{7}{8}$ "

COVER FLUSH WITH FLANGE ALL AROUND

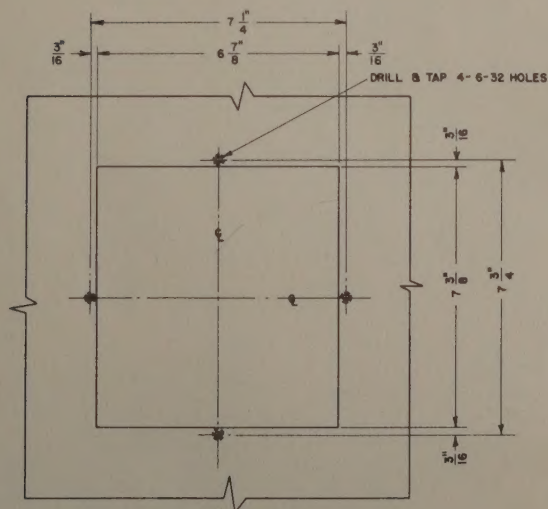
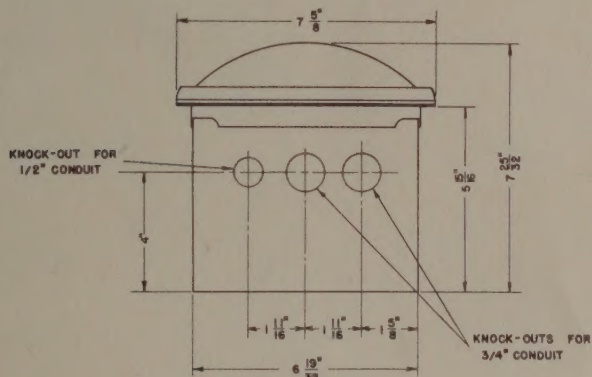
2 $\frac{7}{8}$ "

5 $\frac{3}{4}$ "

7 $\frac{1}{4}$ "

3-HOLES FOR #10 SCREWS (FOR SURFACE MOUNTING)

FRONT VIEW WITH COVER REMOVED

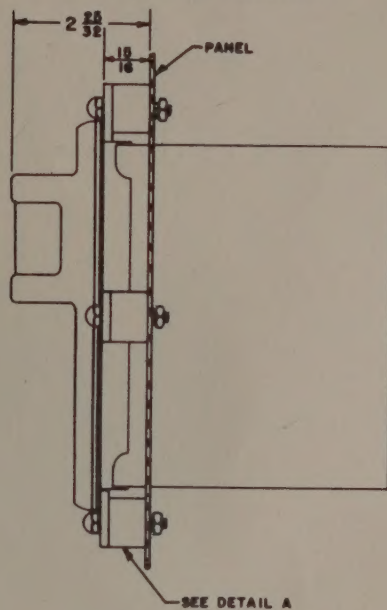


DETAIL OF PANEL CUT-OUT FOR FLUSH MOUNTING

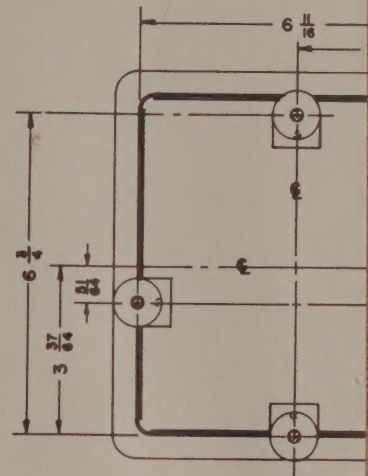


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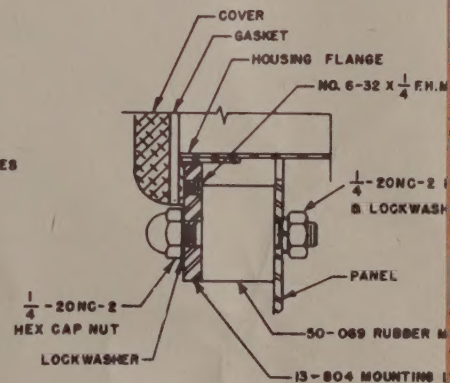
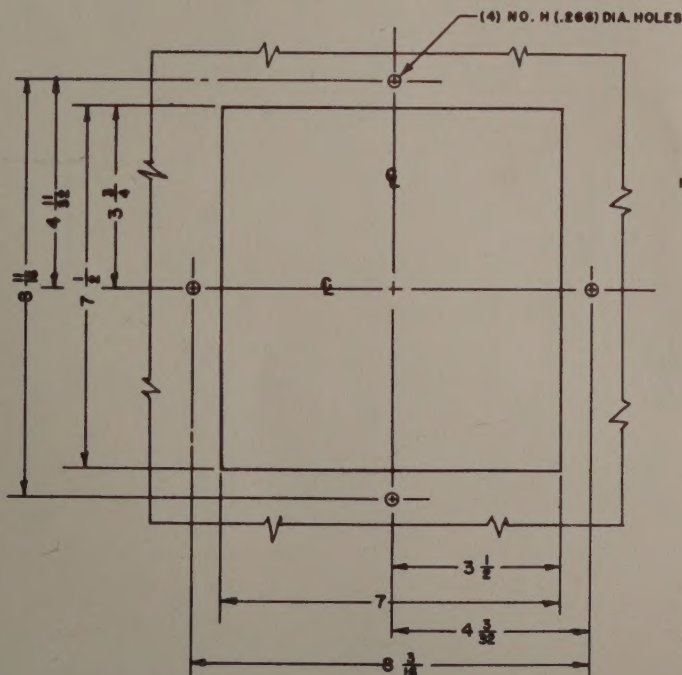
VIBRATION MOUNT ARRANGEMENT
FOR FLUSH MOUNTING



VIBRATION MOUNTING DI
FOR SURFACE MOUNT



DETAIL OF PANEL CUTOUT FOR
VIBRATION FLUSH MOUNTING

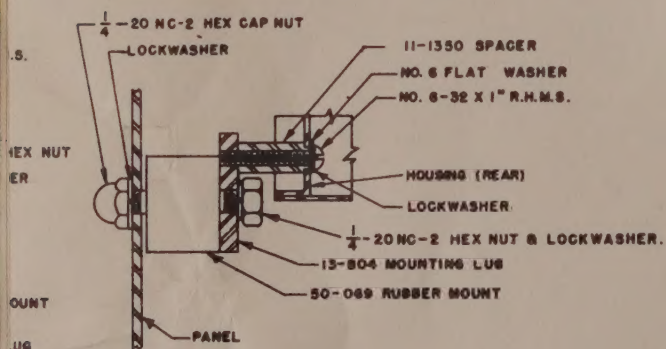
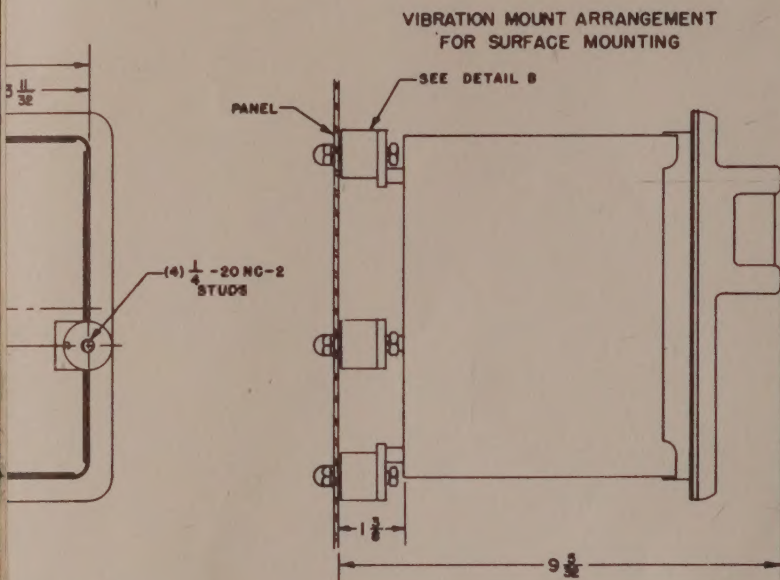


DETAIL A



wheelco instruments
BARBER-COLMAN COMPANY • ROCKFORD, I

, 292, 292C, 293, 297, 591, 596, 792, AND 792R

DIMENSIONS
MOUNTING

DETAIL B



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